

Remarks

Further and favorable reconsideration is respectfully requested in view of the foregoing amendments and following remarks.

Initially, referring to item 1 on page 2 of the Office Action, as noted in the Claim of Priority filed with the present application on January 20, 2004, a certified copy of the Japanese priority application was filed in the parent application, and was acknowledged by the Examiner in the parent application. In support of this, please see the attached Notice of Allowability from the parent application, wherein item 4 acknowledges receipt of the priority document. Accordingly, the Examiner is kindly requested to acknowledge receipt of the priority document in the present application. Please see MPEP 201.14(b).

In response to the objection to the disclosure, the cross reference to the parent application has been amended to indicate the patented status of the parent application, thus rendering the objection to the disclosure moot.

Claims 21-39 have been cancelled in favor of new claims 40-44.

New claim 40 corresponds to claim 21, but recites that the joined object has a joining interface of the lead-free solder to at least one of the article and the member, at which interface there is no segregation of components contained in the solidified lead-free solder. This is supported by the disclosure, for example, from page 7, line 9 to page 8, line 4 of the specification.

New claim 41 corresponds to claim 28.

New claim 42 corresponds to claim 25.

New claim 43 corresponds to claim 33.

New claim 44 corresponds to claim 37.

The patentability of the presently claimed invention after entry of the foregoing amendments, over the disclosures of the references relied upon by the Examiner in rejecting the claims, will be apparent upon consideration of the following remarks.

Initially, in all of the prior art rejections set forth by the Examiner, Applicants have been advised that the method limitations incorporated in the article claims do not impart any patentability. The new claims set forth above do not include method limitations.

The rejection of claims 21-27, 33 and 39 under 35 U.S.C. §102(b) as being anticipated by Sekhar (USP 5,094,700) is respectfully traversed.

This reference, as shown by, for example, the Abstract, discloses a method of preparing an alloy comprising subjecting a semi-solid alloy to vigorous shearing and/or vibration at the solid-liquid interface in order to convert coarse, acicular and/or dendritic intermetallic phases into fine, non-acicular and non-dendritic structures. However, Sekhar fails to disclose that segregation of components contained in the lead-free solder does not exist, at the joining interface of the solder to the article or the member soldered to the article, as required by the present invention.

Furthermore, Sekhar fails to disclose the technical feature defined in the new claim 41, namely that the joined object further comprises a layer of a compound of Sn and Cu at the joining interface.

For these reasons, Applicants take the position that the presently claimed invention is not anticipated by Sekhar.

The rejection of claims 21-34 and 35-39 under 35 U.S.C. §102(b) as being anticipated by Teshima et al. (USP 6,651,870) is respectfully traversed.

Initially, this reference is not cited on the PTO-892 form, or any of the PTO-1449 forms attached to the Office Action. The Teshima et al. reference on the PTO-892 form is USP 6,457,632. Applicants are concurrently submitting herewith a Request for Examiner-Initialed PTO-1449 form citing the Teshima et al. '870 reference applied by the Examiner in rejecting the claims.

The Teshima et al. reference discloses formation of a layer containing a large amount of zinc at an interface between a solder and a metallic layer.

On the other hand, in the present invention, zinc is added into the solder to decrease the melting point of the solder and is not unevenly distributed in the solder.

Further, Teshima et al. fail to disclose that segregation of components contained in the lead-free solder does not exist at the joining interface of the solder to the article or the member soldered to the article; and the reference also fails to disclose a layer of a compound of Sn and Cu at the joining interface.

For these reasons, Applicants submit that the presently claimed invention is not anticipated by Teshima et al.

The rejection of claims 21-39 under 35 U.S.C. §102(b) as being anticipated by Yamaguchi et al. (USP 5,918,795) is respectfully traversed.

This reference discloses that intermetallic compounds are dispersed finely in a soldering alloy so that the mechanical strength is increased (column 2, lines 58-64), but fails to disclose that segregation of components contained in the lead-free solder does not exist at the joining interface of the solder to the article or the member soldered to the article; and the reference also fails to disclose a layer of a compound of Sn and Cu at the joining interface.

Therefore, Applicants respectfully submit that the presently claimed invention is not anticipated by the Yamaguchi et al. reference.

The rejection of claims 21, 33 and 35 under 35 U.S.C. §102(b) as being anticipated by Sarkhel et al. (USP 5,730,932) is respectfully traversed.

This reference discloses compositions of solder, but fails to disclose that segregation of components contained in the lead-free solder does not exist at the joining interface of the solder to the article or the member soldered to the article; and the reference also fails to disclose a layer of a compound of Sn and Cu at the joining interface.

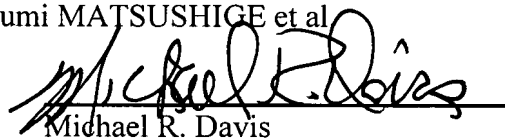
Therefore, Applicants take the position that the presently claimed invention is not anticipated by the Sarkhel et al. reference.

Accordingly, in view of the foregoing amendments and remarks, it is submitted that each of the grounds of objection and rejection set forth by the Examiner has been overcome, and that the application is in condition for allowance. Such allowance is solicited.

Respectfully submitted,

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